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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,473	12/19/2001	Thomas Heitz	50089	8131

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1350 CONNECTICUT AVENUE, N.W.  
WASHINGTON, DC 20036

EXAMINER
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OH, TAYLOR V

ART UNIT	PAPER NUMBER
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1625

DATE MAILED: 05/07/2003

*Y*

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

10/018,473

Applicant(s)

HEITZ ET AL.

Examiner

Taylor Victor Oh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

***Claim Rejections - 35 USC § 112***

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The requirement that the temperature does not increase along the reactor cascade in stage a) is critical or essential to the practice of the invention, but not included in the claim(s) 8 and 9 are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). In claim 4, it is written as stage a) is carried out at from 170 to 250<sup>0</sup> C., whereas in claims 8 and 9, stage b) is carried out at from 220 to 300<sup>0</sup> C and stage c) is carried out at from 240 to 290<sup>0</sup> C; therefore, there is no consistency between the independent and dependent claims. Therefore, an appropriate correction is required.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the

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claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 7 recites the broad recitation a catalyst and the claim also recites preferably tetrabutyl orthotitanate, which is the narrower statement of the range/limitation.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 and 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated clearly by Braune (U.S. 5,854,377).

Braune discloses a preparation of polybutylene terephthalate in the following example:

- a. feeding 1.84 mol of terephthalic acid and 3.68 mol of 1,4-butanediol, 30 ppm of tetrabutyl orthotitanate into the first zone at a temperature of 245<sup>0</sup> C and a pressure of 0.85 bar;
- b. moving the product into the second zone in which the reaction temperature is 260<sup>0</sup> C and the pressure, 0.40 bar;

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c. transferring the product into the third zone in which the reaction temperature is 270<sup>0</sup> C and the pressure, 0.20 bar. (see col. 5 ,lines 25-48).

Furthermore, the precondensate at a temperature of 280<sup>0</sup> C was transferred into a postcondensation reactor (step C) (see col. 5 ,lines 57-58). In addition, the polycondensate obtained has an acid number of from 25 to 30 meq /kg of PBT(see col. 6 ,lines 32-40). This is identical with the claims.

### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braune (U.S. 5,854,377).

Braune discloses a preparation of polybutylene terephthalate in the following example:

- a. feeding 1.84 mol of terephthalic acid and 3.68 mol of 1,4-butanediol, 30 ppm of tetrabutyl orthotitanate into the first zone at a temperature of 245<sup>0</sup> C and a pressure of 0.85 bar;
- b. moving the product into the second zone in which the reaction temperature is 260<sup>0</sup> C and the pressure, 0.40 bar;
- c. transferring the product into the third zone in which the reaction temperature is 270<sup>0</sup> C and the pressure, 0.20 bar. (see col. 5 ,lines 25-48).

Furthermore, the precondensate at a temperature of 280<sup>0</sup> C was transferred into a postcondensation reactor (step C) (see col. 5 ,lines 57-58). In addition, the polycondensate obtained has an acid number of from 25 to 30 meq /kg of PBT(see col.

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6 ,lines 32-40). Also, with a conversion of > 95 %, the esterification product was introduced to the base of a tube bundle reactor (see col. 5 ,lines 40-41).

However, the instant invention differs from the reference in that the conversion at the stage a) is > 97 %.

Even so, the reference does indicate that, with a conversion of > 95 %, the esterification product was introduced to the base of a tube bundle reactor (see col. 5 ,lines 40-41); the conversion range in the prior art reference does include the claimed range. Therefore, it would have been obvious to the skilled artisan in the art to have assumed that the prior art conversion range did contain the claimed range.

Braune does teach the preparation of polybutylene terephthalate by reacting terephthalic acid and 1,4-butanediol in the presence of tetrabutyl orthotitanate with the conversion of > 95 % of terephthalic acid before the esterification product was introduced to the base of a tube bundle reactor. Therefore, it would have been obvious to the skilled artisan in the art to have assumed that the prior art conversion range did contain the claimed range.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Heinze et al (US 4,499,261) discloses a continuous multistep process of making polybutylene terephthalate in which the 1,4-butanediol in the presence of a catalyst is used to transesterify dimethyl terephthalate during the precondensation and polycondensation steps .

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Iida et al (US 4,656,241) discloses a method of producing polybutylene terephthalate by reacting a dicarboxylic acid component containing terephthalic acid with a glycol component containing 1,4-butanediol in 0.4 to 1.3 mole of 1,4-butanediol per mole terephthalic acid in the presence of an esterification catalyst.

Strehler et al (US 4,056,514) discloses a continuous process of making polybutylene terephthalate in which the 1,4-butanediol in the presence of a catalyst is used to transesterify dimethyl terephthalate in the molar ratio of from 1:1.2 to 1: 1.5 during the precondensation and polycondensation steps at a temperature of from 160<sup>0</sup> C to 230<sup>0</sup> and at a pressure of from 2 mm Hg to 20 mm Hg.

Yuo et al (US 5,519,108) discloses a catalyst composition for the method of producing polybutylene terephthalate from dimethyl terephthalate comprising a) a titanium compound catalyst, b) a co-catalyst containing Zn, Co, Mn, Mg, Ca or Pb, C) a second co-catalyst containing an alkali metal phosphate.

Hall, Jr. et al discloses a process of making polybutylene terephthalate by the two stage reaction of terephthalic acid with 1,4-butanediol in which acid and diol are first subjected to catalytic esterification/oligomerization and the resultant products are further subjected to catalytic polycondensation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 703-305-0809. The examiner can normally be reached on 8:30-5:00.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alan Rotman can be reached on 703-308-4698. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-2742 for regular communications and 703-305-7401 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1235.



May 4, 2003



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